Insight into the spatial distribution of nutrient elements and sediments fraction analysis in Taihu Lake

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ABSTRACT

Lake eutrophication in China is a serious issue and has raised urgent attention, which is required for a better understanding of the eutrophic status. Particularly, the eutrophication of shallow lakes has received public attention for shallow lakes are vulnerable to changes in eutrophic status due to the closer proximity with bottom lake sediments. Herein, a comprehensive investigation on the spatial distribution of nutrient elements (including carbon, nitrogen and phosphorus) was conducted in a typical large shallow lake Taihu Lake, and the internal patterns between the distribution and eutrophic status were analyzed. The results showed that the distributions of nutrient elements in surface sediment displayed spatial diversity in different regions. Zhushan Bay, East Taihu Lake and Dongjiaozui Bay hold distinguished pattern of nutrient contents due to the different geographical locations and economic pattern of adjacent areas. Specifically, the concentrations of total carbon and total nitrogen in East Taihu Lake were significantly higher than other areas, and total phosphorus content in Zhushan Bay was the highest. Furthermore, different phosphorus fractions in sediment and eutrophic indicators of water column were further analyzed to reveal the potential contribution of sediments to nutrient loadings of overlying water. The phosphorus fraction analysis suggested that calcium bounded phosphorus accounted for the main component. Correlation analysis revealed the internal relations among various characteristics in sediment or water, which indicated that microcystis blooms were accompany with excessive COD and phosphorus and depletion of dissolved oxygen. The results offered a comprehensive understanding of the lake eutrophic status and benefited further the study on the ecological status assessment.

Keywords: Nutrient elements; Spatial distribution; Phosphorus fraction; Surface sediment; Correlation analysis

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